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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/955,230 | 09/18/2001 | Christopher J. Kelly | INTL-0644-US (P12307) | 8306 |
| 7590 01/16/2004 | | | EXAMINER | |
| Timothy N. Trop TROP, PRUNER & HU, P.C. Suite 100 8554 Katy Freeway Houston, TX 77024-1805 | | | DINH, TUAN T | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2827 | |
| DATE MAILED: 01/16/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/955,230

Applicant(s)

KELLY ET AL.

Examiner

Tuan T Dinh

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kirkman (U. S. Patent 6,064,113) in view of Nuxoll et al. (U. S. Patent 6,307,769).

As to claims 1, 3-5, Kirkman discloses a printed circuit board (substrate 42 of a package 40-figure 2, column 5, line 56) as shown in figures 2-5 comprising:

a printed circuit board substrate (100; 200; 300, which are one of layers of the substrate 42, see attached paper)

a signal layer (80-figure 3, column 7, line 14) supported by the printed circuit board substrate (100; 200; 300), the signal layer (80) comprising traces (66, 68, column 6, lines 26-27) to communicate signals not associated with regulated supply voltage; and

a supply voltage plane (46, 48, column 5, lines 62-63) supported by the substrate (100; 200; 300) having an outer boundary, lies substantially within a region located directly below a component (die 62-figure 3) and embedded in the signal layer (80) to supply power of the component (die 62-figure 3) mounted to the printed circuit board (42).

Kirkman does not disclose the component having a multiple pins connected to the PCB. Nuxoll shows a PCB (31, column 9, line 47) in figures 3A-3C comprising a component (33, 35, column 9, lines 50-52) having supply voltage pins (column 10, lines 5-33) mounted to the PCB.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a component having supply voltage pins in the PCB of Kirkman, as taught by Nuxoll et al., for the purpose of providing inputs/outputs of power and ground signal terminals to the PCB.

As to claims 2, 6-7, Kirkman discloses the PCB in figure 3 further comprising a supply voltage plane layer (84, column 7, line 42) separate from the signal layer (80), and the supply voltage plane layer (84) comprises an embedded ground plane (90, column 7, lines 41-42) to provide ground connections (solder balls, see figure 3) for the signal layer (80), the ground connections associated with electrical devices (not shown) connected to the component.

As to claims 8-11, Kirkman discloses the PCB as shown in figure 3 wherein the ground plane (90) having an outer boundary and larger than the supply voltage plane. The ground plane lies substantially within a region located directly below the component.

As to claim 12, Kirkman discloses the PCB as show in figure 3 further comprising:

a core layer (300, see the attached paper),

wherein the signal layer (80) and the supply voltage plane layer (84) are located on the same side of the core layer.

As to claims 13-14, Kirkman discloses the PCB as shown in figures 2-5 wherein the supply voltage and the ground plane, each reduces and inductance.

As to claims 15, 17-19, Kirkman discloses a printed circuit board (42, see figures 2-3) comprising:

- a printed circuit board substrate (100; 200; 300);

- a supply voltage plane layer (84-see figure 3) supported by the substrate to communicate a supply voltage; and

- a ground plane (90) supported by the substrate embedded in the supply voltage plane layer (84), the ground plane has an outer boundary, locates directly below a component (die 62), associates with electrical devices (not shown), and provides ground connections (by ground vias) to the component (62) mounted on the printed circuit board.

Kirkman does not disclose the component having a multiple pins connected to the PCB. Nuxoll et al. shows a PCB (31) in figures 3A-3C comprising a component (33, 35) having multiple pins mounted to the PCB.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a component having multiple pins in the PCB of Kirkman, as taught by Nuxoll et al., for the purpose of providing grounding connection between the component to the PCB.

As to claim 16, Kirkman discloses the PCB as shown in figure 3 further comprising: a ground plane layer (82) separate from the supply voltage plane layer (260).

Regarding claims 20-29, the method is necessitated by the PCB structure as disclosed by Kirkman in view of Nuxoll et al. in claims 1-19.

Response to Arguments

3. Applicant's arguments filed 10/23/03 have been fully considered but they are not persuasive.

Applicant argues:

(a) The examiner fails to establish a prima facie case of obviousness for claims 1-29 for at least the reason that the examiner fails to show where the prior art contains the alleged suggestion or motivation to combine Kirkman and Nuxoll.

(b) Kirkman discloses a semiconductor package and does not disclose or suggest a printed circuit board.

Examiner disagrees.

Response to argument (a) and (b), applicant recites "a printed circuit board" and "a method" in claims 1-29 and does not describe that the printed circuit board can be used in what applications and what the method can be used to.

The printed circuit board (PCB), which is a board that contains printed circuits on the board, further the board can be called in other words, which is a substrate or circuit board. However, The Kirkman's reference discloses a semiconductor device package

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(40) clearly shown in figures 2-4 having a substrate (42). The substrate has multilayer substrates (100; 200; 300, see the attached paper).

Kirkman and Nuxoll clearly teach all of the limitations of the claimed invention in combination as explained above (see portion 2).

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T Dinh whose telephone number is 703-306-5856. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 703-308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0658.

Tuan Dinh
January 07, 2004.

A handwritten signature in black ink, appearing to read 'Tuan Dinh', with a large loop at the end.